

## **R450M RF Exposure**

### **General Information:**

Applicant: Neptune Technology Group

Device Category: Mobile

Environment: General Population/Uncontrolled Exposure

Rule Section: FCC Part 1.1310, 2.1091; IC RSS-102

### **Technical Information:**

Antenna Type: Dipole

Antenna Gain: 2.15dBi

Maximum Transmitter Conducted Power: 30.79dBm / 1.20W

Maximum System EIRP: 32.94dBm / 1.97W

### **Source-Based Time-Averaging**

The device operates with a source-based time-averaged duty cycle of 0.25%. The unit will transmit a configuration packet upon initialization and then once every thirty days. A 100ms reading packet will be transmitted 40 seconds following the configuration packet. The reading packet can also be transmitted up to 16 times per day depending on the mode of operation but will never be less than 40 seconds apart.

The measured power level was reduced by a factor 26.02dB to account for the duty cycle. The duty cycle correction factor is determined using the formula:  $10\log(0.1/40) = -26.02\text{dB}$ .

Corrected Maximum Transmitter Conducted Power Level =  $30.79\text{dBm} - 26.02 = 4.77\text{dBm} / 3.00\text{mW}$

Corrected Maximum System EIRP: 6.92dBm / 4.92mW

### **MPE Calculation**

The Power Density ( $\text{mW}/\text{cm}^2$ ) is calculated as follows:

$$S = \frac{PG}{4\pi R^2}$$

Where:

S = power density (in appropriate units, e.g.  $\text{mW}/\text{cm}^2$ )

P = power input to the antenna (in appropriate units, e.g., mW)

G = power gain of the antenna in the direction of interest relative to an isotropic radiator

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm)

MPE Calculator for Mobile Equipment Limits for General Population/Uncontrolled Exposure*							
Transmit Frequency (MHz)	Radio Power (dBm)	Power Density Limit (mW/Cm2)	Radio Power (mW)	Antenna Gain (dBi)	Antenna Gain (mW eq.)	Distance (cm)	Power Density (mW/cm^2)
450	4.77	0.30	3.00	2.15	1.641	20	0.001

### **Conclusion**

This device is exempt from routine environment evaluation for RF exposure. According to Part 2.1091(d), mobile devices that operate in part 90 of this chapter are subject to routine environmental evaluation for RF exposure prior to equipment authorization or use if they operate at frequencies of 1.5 GHz or below and their effective radiated power (ERP) is 1.5 watts or more. The system source-based time-averaged ERP was calculated as 6.92dBm / 4.92mW.

This device complies with the MPE requirements by providing adequate separation between the device, any radiating structure and the general population.